

AMENDMENTS TO THE SPECIFICATION

Applicants have cancelled method claims 41-55 and 60-62. Applicants reserve the right to prosecute these claims in another patent application.

Applicants have amended independent claims 1, 23, 36, 56, 58 and 59 to incorporate an element from claims 3 and 28, that the "grating structure is a superposition of a plurality of grating structures of different periodicities for the incoupling of excitation light of different wavelengths." Applicants have also amended the claims to incorporate an element from claim 11, that the "grating structure has a laterally varying periodicity either in parallel or perpendicular to a direction of propagation of the incoupled excitation light in said first optically transparent layer". Applicants have also cancelled claims 3, 11 and 28. Additional support for these amendments is found in Fig. 6 of the application a filed. No new matter is added.

35 U.S.C. §112, Definiteness

The Examiner has rejected method claims 41-55 and 60-62, for alleged indefiniteness. The Examiner alleges that the claimed methods do not set forth any steps involved in the process. Applicants have cancelled method claims 41-55 and 60-62. Accordingly, this rejection is now moot. Applicants reserve the right to prosecute these claims in another patent application.

35 U.S.C. §101, Statutory Subject Matter

The Examiner has rejected method claims 41-55 and 60-62, alleging that the claimed methods do not set forth any steps involved in the process. Applicants have cancelled method claims 41-55 and 60-62. Accordingly, this rejection is now moot. Applicants reserve the right to prosecute these claims in another patent application.

35 U.S.C. §102, Anticipation

The Examiner has rejected claims 1, 2, 4-10, 12-17, 19-27, 29-50 and 53-62 as allegedly being anticipated by published PCT patent application WO 96/35940 (*Neushäfer*). Applicants have amended independent claims 1, 23, 36, 56, 58 and 59 to recite an element from claim 3, that the "grating structure is a superposition of a plurality of grating structures of different periodicities for the incoupling of excitation light of different wavelengths." This grating structure is not disclosed in *Neushäfer* (see Office Action of November 9, 2005, page 17, section 12).

Accordingly, *Neushäfer* does not disclose all the elements recited in claims 1, 2, 4-10, 12-17, 19-27, 29-50 and 53-62. Thus, *Neushäfer* does not anticipate these claims as amended. Applicants respectfully request that this rejection under 35 U.S.C. §102 be withdrawn.

35 U.S.C. §103, Obviousness

The Examiner has rejected claims 3 and 28 as allegedly unpatentable over *Neushäfer* in view of U.S. Pat. No. 5,455,178 (*Fattinger*). The Examiner alleges that *Fattinger* teaches that gratings can be unidiffractive or multidiffractive (*i.e.*, a superposition of two or more gratings) for light coupling, and that therefore it would have been obvious to provide a system according to *Neushäfer* with a multidiffractive grating as the grating structure to analyze samples of different luminescence which require excitation of luminescence with light sources of different wavelengths. Applicants respectfully traverse.

To establish a *prima facie* case of obviousness, there must be a motivation to combine reference teachings and there must be a reasonable expectation of success. MPEP §2143. Here, the combination of *Neushäfer* with *Fattinger* does not result in the invention as presently claimed, with the advantageous uses of the claimed invention as disclosed in the specification.

The specification, page 16-17, paragraph 54, discloses an advantageous use of the invention of claim 3 or 28 as presently claimed.

[0054] For many applications, especially in the field of biology, it is desired to use excitation of different excitation wavelengths and luminophores of different excitation wavelengths and similar or different emission wavelengths, or excitation light of similar excitation wavelength and luminophores of different emission wavelengths, for purposes of referencing using a control substance or for purposes of calibration. Then, it is advantageous if the grating structure, continuously modulated in the area of the two or more measurement areas or segments, is a superposition of two or more grating structures of different periodicities (see Figs. 6a and 6b) for the incoupling of excitation light of different wavelengths. The grating lines can be orientated in parallel or not in parallel, but preferably not in parallel, to each other. However, in the case of two superimposed grating structures, their grating lines are preferably perpendicular to each other.

This advantageous use is further explicated in the specification, page 25, paragraph 82.

[0082] In a case of insufficient intensity of a single light source or in a case of a need for light sources with different emission wavelengths, for example for biological applications, it is advantageous if two or more coherent light sources of similar or different emission wavelength are used as excitation light sources. In the case of light sources of different emission wavelengths it is then advantageous if the excitation light from two or more coherent light sources is launched simultaneously or sequentially from different directions on the grating structure (c), which comprises a superposition of grating structures of different periodicity.

Fattinger does not discuss the use of luminophores of different excitation wavelengths and similar or different emission wavelengths (depending on the experiment to be performed), which would be advantageous in the field of biology (a field not discussed by *Fattinger*). In general, the disclosure of *Fattinger* is directed to "Two coherent (e.g. orthogonally polarized) beams of light are simultaneously coupled into and decoupled from the waveguide by means of the multidiffractive grating structure . . ." (see *Fattinger*, col. 10, number 7).

The combination of *Neushäfer* with *Fattinger* does not result in a system that can be useful in the field of biology for the measurement of analytes having luminophores of different excitation wavelengths. Accordingly, the combination of *Neushäfer* with *Rudigier* does not render obvious the claimed invention. Applicants respectfully request that this rejection under 35 U.S.C. §103 be withdrawn.

The Examiner has rejected claims 11 and 51 as allegedly unpatentable over *Neushäfer* in view of U.S. Pat. No. 5,738,825 (*Rudigier*). The Examiner alleges that *Rudigier* teaches that gratings for light coupling can have a laterally varying periodicity in parallel or perpendicular to the direction of the propagation of the incoupled light, and therefore it would have been obvious to provide system according to *Neushäfer* with a laterally varying periodicity grating as a grating structure to analyze samples of different luminescence which require excitation of luminescence with light sources of different wavelengths. Applicants respectfully traverse.

To establish a *prima facie* case of obviousness, there must be a motivation to combine reference teachings and there must be a reasonable expectation of success. MPEP §2143. Here, the combination of *Neushäfer* with *Rudigier* does not result in the invention as presently claimed, with the advantageous uses of the claimed invention as disclosed in the specification.

The specification, page 20, paragraphs 64 and 65, discloses an advantageous use of the invention of claim 11 as presently claimed.

[0064] For reducing the requirements on the parallelism of the excitation light bundle and on the exact adjustment of the resonance angle, it can be advantageous if the grating structure (c) has a laterally varying periodicity in parallel or perpendicular to the direction of propagation of the incoupled light in layer (a). Then, out of a convergently or divergently launched ray bundle illuminating a large area, an incoupling will occur at that location on the grating structure where the resonance condition is satisfied.

[0065] In addition, such a grating structure with a laterally varying periodicity in parallel or perpendicular to the direction of propagation of the incoupled light in layer (a) enables a method, wherein, besides the determination of one or more luminescences, changes of the effective refractive index on the measurement areas can be determined. For this method, it can be advantageous if the one or

more luminescences and / or determinations of light signals at the excitation wavelength are performed in a polarization-selective way.

Rudigier does not disclose the advantage of using luminescences in a polarization-selective way.

Moreover, *Rudigier* does not disclose the elements of “wherein said grating structure is a superposition of a plurality of grating structures of different periodicities for the incoupling of excitation light of different wavelengths” as recited in claim 1, from which claim 11 is dependent. The combination of *Neushäfer* with *Rudigier* does not teach all the limitation of the claims as presently amended. Accordingly, the combination of *Neushäfer* with *Rudigier* does not render obvious the claimed invention. Applicants respectfully request that this rejection under 35 U.S.C. §103 be withdrawn.

Applicants have cancelled claim 51. Accordingly, this rejection is now moot as applied to claim 51.

The Examiner has rejected claim 18 as allegedly unpatentable over *Neushäfer* in view of U.S. Pat. No. 5,101,459 (*Sunagawa*). The Examiner alleges that *Sunagawa* teaches a grating structure that has laterally varying depth in parallel to the direction of the incoupled excitation light in order to enhance the coupling efficiency of laser beam sources and waveguides, and that therefore it would have been obvious to provide system according to *Neushäfer* with a laterally varying depth in parallel to the direction of the incoupled excitation light in order to enhance the coupling efficiency between laser beam sources and the waveguiding layer. Applicants respectfully traverse.

To establish a *prima facie* case of obviousness, the prior art references must teach or suggest all the claim limitations. MPEP §2143. Here, claim 18 is dependent on claim 1, which recite the elements of a “grating structure is a superposition of a plurality of grating structures of different periodicities for the incoupling of excitation light of different wavelengths, wherein said grating structure has a laterally varying periodicity either in parallel or perpendicular to a direction of propagation of the incoupled excitation light in said first optically transparent layer”. The combination of *Neushäfer* with *Sunagawa* does not teach these features. Accordingly, the combination of combination of *Neushäfer* with *Sunagawa* does not render obvious claim 18, following the present amendments. Applicants respectfully request that this rejection under 35 U.S.C. §103 be withdrawn.

The Examiner has rejected claim 52 as allegedly unpatentable over *Neushäfer* in view of U.S. Pat. No. 5,577,137 (*Groger*). Applicants have cancelled claim 52. Accordingly, this rejection is moot.